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Chemotropism of roots.—In a preliminary paper, PORODKO[8] reports upon the chemotropism of the roots of *Lupinus albus* and *Helianthus annuus*. Roots 20–35 mm. long were placed in a lamella of agar varying in thickness from 6 to 60 mm., which separated the solution used from water. In all, 50 chemical substances were used, the concentration of which varied from 0.1 *n* to 0.001 *n*. As a rule, the roots did not remain straight, but bent against or with the diffusion stream. The range of concentration between maximum and minimum depended upon the substance used and the thickness of the agar lamella. Concentrations close to the maximum caused bending against the diffusion stream or positive response, which effect was observed with both electrolytes and non-electrolytes. PORODKO considers this a traumatropic response, due to the inhibition of growth on the up-stream side of the root. With lower concentrations, electrolytes and non-electrolytes affect the roots differently. The former cause great regularity as regards the direction of bending of the root, while the latter produce positive, negative, and intermediate responses. Acids, alkalies, and carbonates cause positive, and neutral salts negative bendings. The responses due to H and OH ions are considered to be traumatropic. The amount of negative response seems to depend upon the cation, being greater in the presence of one with a double charge than in the presence of one with a single charge. In many cases the responses are not all of one kind. Nevertheless, it is necessary to explain the cause of all. From his experiments, PORODKO concludes that positive but not negative responses can take place in decapitated roots, and that the latter, but not the former, show up as after-effects, although only on the clinostat. The two reactions are different in nature, the positive being passive and caused by the inhibitory effect of the greater concentration on the growing region on the up-stream side of the root, the negative being active and due to the chemotropic effect of the diffusion stream, which tends to accelerate the growth on the up-stream side. Hence, upon the growing region of a root of *Lupinus albus* subjected to the influence of the diffusion stream of a chemical substance, two antagonistic tendencies are at work, the direction of bending of the root being dependent upon the relative strengths of the two tendencies. Roots of *Helianthus annuus* act differently from those of *Lupinus albus*, in that they show only traumatropic response, but why this is true is not known.—R. CATLIN ROSE.

National Academy of Sciences.—At the annual session of 1910 two botanical papers were presented (April 19), which may be outlined as follows:

"The distribution of *Agave* in the West Indies," by WILLIAM TRELEASE.—Three main types of *Agave* are recognized in the West Indies: one confined to the southwestern Cuban region, another to the Inaguas, and the third ranging through the entire archipelago. Subtypes of the latter are limited respectively to the Greater Antilles, the Bahamas, the Caribbees and the Leeward Islands, and the

8 PORODKO, THEODOR, Ueber den Chemotropismus der Wurzel. Ber. Deutsch. Bot. Gesell. **28**:50–57. 1910.

adjoining Venezuelan coast. Within these groups specific differentiation is observable, so that each island isolated by a 100-fathom channel has its endemic species, the islands with a common coastal plain possessing little if at all differentiated forms. The almost entire absence of the genus from South America and the geographic grouping of species and superspecies in the West Indies indicate that *Agave* penetrated from the Central American mainland, where it centers, and overran the terrain before the disruption into islands, two or perhaps three parent stocks being involved.

"The vascular plate and cotyledons of gymnosperms," by JOHN M. COULTER.—Among the various vascular structures of gymnosperms that have been used to suggest progressive evolutionary changes, the vascular plate of the cotyledonary node is perhaps as significant as any, especially its connections with the cotyledons. Series of cycads, of conifers, and of other gymnosperms were shown to illustrate the following general tendencies: to reduce the cotyledons to two, to reduce the protoxylem poles of the vascular plate (and hence the root poles) to two, to eliminate certain vascular connections of the cotyledons, and to restrict the branching of strands within the cotyledons.

Differentiation among chromosomes.—*Crepis virens* seems to afford promising material for the solution of several difficult cytological problems. JUEL had already found the diploid and haploid numbers in *C. tectorum* to be 8 and 4. ROSENBERG[9] now finds the numbers in *C. virens* to be 6 and 3, the lowest numbers yet established for plants. The fact that the chromosomes are so few and that they are readily recognized as "prochromosomes" in the resting nucleus, removes any danger of uncertainty in counting which might be anticipated in case of large numbers. Not only is the number low, but the individual chromosomes are not alike, two being long, two rather short, and two intermediate. In the diploid divisions these three kinds of chromosomes appear in pairs, the members of a given pair being alike. At synapsis a double thread appears, and there is a fusion which is to be regarded as a fusion of whole chromosomes, reduction in number being brought about in this way. ROSENBERG suggests that interesting results might be obtained by crossing *Crepis virens* and *C. tectorum*, and he promises to make the attempt.

Noting the low number of chromosomes in *Crepis tectorum* (8 and 4) and in *C. virens* (6 and 3), TAHARA[10] examined the Japanese species, *C. japonica*, and found the numbers to be 16 and 8, just double the numbers in *C. tectorum*. The chromosomes were also found to be of different sizes and forms. If there is a relation between specific characters and chromosomes, the genus *Crepis* would seem to the reviewer to be a favorable form for the investigation of this subject.—CHARLES J. CHAMBERLAIN.

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9 ROSENBERG, O., Zur Kenntniss von den Tetradenteilung der Compositen. Svensk. Bot. Tidskrift **3**:64–77. *pl. 1.* 1909.

10 TAHARA, M., Ueber die Zahl der Chromosomen von *Crepis japonica* Benth. Bot. Mag. **24**:23–28. *pl. 2.* 1910.